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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/539,918	03/31/2000	James M. Florence	BWD:7146.063	9507

7590

09/16/2002

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EXAMINER

DI GRAZIO, JEANNE A

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 09/16/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/539,918

Applicant(s)

FLORENCE ET AL.

Examiner

Jeanne A. Di Grazio

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other:

DETAILED ACTION

Effective Filing Date: March 31, 2000.

Claim Objections

Claims 5, 7, and 12 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 5 and 7 claim a second color component rotator that is already claimed in claim 3. Claim 12 claims a dichroic filter that is already claimed in claim 10.

Claim 19 is objected to because of the following informality: "fly's eye" should read, "fly's eye." Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 recites the limitation "said polarization converter" in line 12. There is insufficient antecedent basis for this limitation in the claim. Because claims 2-16 depend upon claim 1, they are also rejected as indefinite.

Claims 1 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: there is no spatial cooperative relationship for the light source, polarizing device, beamsplitter, LC panel, and projection source. It is not clear from the scope of the claim(s) how these elements relate to each other. Applicant has attempted to claim a list of elements. Because claims 2-16 depend upon claim 1, they are further rejected as indefinite. Because claims 18-31 depend upon claim 17, they are further rejected as indefinite.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. (USPN 6,304,302 B1)(J. Huang) in view of Huang et al. (USPN 6,309,071 B1)(A. Huang).

Per claims 1-16: a light source [J. Huang, 300]; polarizing device [J. Huang, FIG.3]; at least one polarizing beam splitter [J. Huang, 306]; at least one LC panel [J. Huang, 310] for generating an image; projection source [J. Huang, 311] for projecting said image; color component rotator [J. Huang, 305] located between said polarization converter [J. Huang, 302] and said projection source [J. Huang, 311].

A light source, polarizing device / converter, polarizing beam splitter, LC panel, projection source, and color component rotator are all common elements in the art of LC projection systems for light valves and the like.

J. Huang discloses a half-wave plate [305] between an optical film [302] and projection lens [311]. The optical film acts as a polarizing device. The projection lens can project incident light onto a screen [Col. 4, Lines 29-30].

- Color component rotator is:
 - between said polarizing beamsplitter [J. Huang, 306] and said light source [J. Huang, 300]
 - between a polarizer and an analyzer

A. Huang et al. discloses a color component rotator [134] between a polarizer [124] and analyzer [136].

- Second color component rotator.

A. Huang discloses the use of two color component rotators.
- Second and third LCD panels for generating a second (and third) image, respectively.

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A. Huang discloses the use of multiple LCD panels.

- Polarizing device: is a polarization converter.
- Pair of relay lenses. Relay lenses are often used to focus and then retransmit images.
- Dichroic filter.
 - red, blue, green

Dichroic filters are typically used to separate light from a source into separate red, green, and blue components. A. Huang discusses the use of dichroic filters in the prior art [Col. 1, Lines 29-31].

- Third and fourth color component rotator. A. Huang discloses the use of multiple color component rotators.

Claims 17-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. (USPN 6,304,302 B1)(J. Huang) in view of Huang et al. (USPN 6,309,071 B1)(A. Huang) in further view of Takahara et al. (USPN 6,142,633).

Per claims 17-31: a light source; polarization converter; at least two polarizing beam splitters; at least three LCD panels each for generating a respective image; projection source for projecting said images; and at least two color component rotators, each of said color component rotators being located between said polarization converter and said projection source.

Multiple PBSs and multiple LCD panels (light valves) are common elements in the art of projection systems for light valves.

See Figure 2 of A. Huang et al. for placement of the color component rotators with respect to the polarization converter and projection source. Furthermore, Hashizume (USPN 6,089,718) discloses the placement of wave plates at various positions in an optical path.

- Color component rotators are:
 - between one of said polarizing beamsplitters and said polarization converter
 - between a polarizer and an analyzer

See previous arguments and Hashizume (USPN 6,089,718).

- Polarization converter: comprises a fly's eye lens plate and prism array.

Takahara et al. discloses a polarization conversion element near a fly's eye lens and near a prism (Prior Art, FIG. 21) for the purpose of converting various polarized light components into undirectionally polarized light. It would have been obvious, at the time the invention was made, to make the polarization conversion element out of the fly's eye lens plate and prism (as opposed to near these elements) in order to reduce the size of the optical system. It is generally always preferable to reduce the size of complex optical systems for ease of manufacturing and cost.

- Dichroic filter(s) and crossed dichroic prism.
 - Dichroic filters define at least two color channels, and one of said polarizing beam splitters is located in one of said color channels and the other of said polarizing beam splitters is located in the other of said color channels.

Dichroic filters reflect certain wavelengths and transmit other wavelengths; thus, a dichroic filter defines a given color channel. The placement of a beam splitter in a given channel acts to reflect wavelengths of a given state and to transmit wavelengths of another given state. Dichroic filters and beam splitters act in concert with each other, reflecting and transmitting appropriate wavelengths.

Hashizume (USPN 6,089,718) discloses the use of a crossed dichroic prism in a projection display device for the purpose of forming a color image by synthesizing light of three colors [Col. 9, Lines 23-25].

- Third polarizing beam splitter. Multiple PBSs are common in the art.
- Each polarizing beam splitter reflects a color component onto a respective one of said LCD panels. This is the general principle behind light valves.
- A pair of relay lenses. Relay lenses have been previously addressed.
- Projection source projects a projected image formed from three color components.
 - red, blue, green

Projection sources project images comprised of, among other things, various color components.

- Third and fourth color component rotator. Multiple wave plates (color component rotators) have been used before in the art.

- Fourth color component rotator is located between said projection source and one of said polarizing beamsplitters in which said three images are combined. A. Huang et al. in general.
- Three images generated by said LC panels are combined in one of said polarizing beam splitters. The purpose of the beam splitter, in part, is to combine images generated by a given LC panel.

Claims 32-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashizume (USPN 6,089,718).

Per claims 32-43 (method): providing a light comprised of first, second, and third color components; converting said light to a single polarization state; separating said first color component from said second and third color components; changing said polarization state of said second color component relative to said third color component; separating said second color component from said third color component; generating respective images from each of said first, second, and third color components; and projecting said image ... (further) changing the polarization state of said first color component before (OR, after) generating said image from said first color component.

- First, second, and third color components are:
 - green, blue, and red respectively.
 - reflected onto respective LCD panels (OR, using only two polarizing beam splitters) to generate said images
 - reflected onto respective LCD panels using three polarizing beam splitters
- Second color component polarization state is:
 - changed again before / after generating said image from said second color component.
 - changed using a color component rotator.
- First color component is separated from said second and third color component using a dichroic filter.

- o Second color component is separated from said third color component using a polarizing beam splitter.

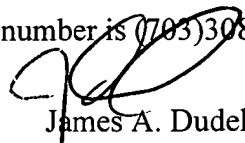
Hashizume discloses light converted to a single polarization state, green light separated from red and blue light, changing polarization states and separating polarization states of light, and forming and projecting images. Polarizing beam splitters function, in part, to generate images. The generation of images can be accomplished via one, two, or three PBSs. The use of a dichroic filter or PBS to separate light is a matter of preference that may take into account manufacturing ease, convenience, and cost.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Jeanne A. Di Grazio whose telephone number is (703)305-7009. The Examiner can normally be reached on M-F.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, William Sikes can be reached on (703)308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703)746-8741 for regular communications and (703)746-8741 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Jeanne Andrea Di Grazio


James A. Dudek, Primary Examiner

JDG
September 10, 2002